Having described the preferred embodiments, the invention is now claimed to be:

1. A diagnostic imaging system (10) including:

a diagnostic imaging scanner (12) that acquires imaging data of a subject in an examination region (20);

a reconstruction processor (46) that reconstructs the acquired imaging data into an image representation;

a pair of electrodes (30, 32) adapted to contact a thoracic region of the subject;

an electrical meter (34) that measures a time-varying electrical parameter (70) across the electrode pair (30, 32); and

a monitor (36) that extracts a time-varying respiration characteristic (90, 98, 110, 120) from the measured time-varying electrical parameter (70).

2. The imaging system (10) as set forth in claim 1, wherein the time-varying electrical parameter (70) is selected from a group consisting of:

a time-varying complex impedance,
a time-varying resistance,
a time-varying capacitance,
a time-varying inductance,
a time-varying current, and
a time-varying voltage.

3. The imaging system (10) as set forth in claim 1, wherein the diagnostic imaging scanner (12) is a computed tomography scanner.

4. The imaging system (10) as set forth in claim 1, wherein the electrical meter (34) includes:

a voltage pulse generator (72) that applies a voltage pulse train to the electrode pair (30, 32); and

an ammeter (74) that measures an electrical current flowing between the electrode pair (30, 32) responsive to the applied voltage pulse train.

5. The imaging system (10) as set forth in claim 1, further including:

an imaging controller (64) that receives the respiration characteristic (90, 98, 110, 120) and controls the diagnostic imaging scanner (12) based thereon.

6. The imaging system **(10)** as set forth in claim **1**, wherein the monitor **(36)** includes:

a differentiator **(94, 106)** that computes a time derivative of the time-varying electrical parameter **(70)**.

7. The imaging system **(10)** as set forth in claim **6**, wherein the time-varying electrical parameter **(70)** includes a time-varying resistance, the differentiator **(94)** computes a first derivative, and the monitor **(36)** further includes:

a respiration state processor **(96)** that computes the respiration parameter **(90)** as one of:

inhaling corresponding to a positive time derivative of the time-varying resistance,

exhaling corresponding to a negative time derivative of the time-varying resistance, and

a breath-hold state corresponding to a substantially zero time derivative of the time-varying resistance.

8. The imaging system **(10)** as set forth in claim **1**, wherein the monitor **(36)** includes:

a respiratory cycle phase processor **(104)** that estimates a respiratory cycle phase **(110)** based on the time-varying electrical parameter **(70)**.

9. The imaging system **(10)** as set forth in claim **1**, wherein the monitor **(36)** includes:

a calibration **(122)** that correlates electrical parameter values with a tidal volume of air in lungs of the subject; and

a transform processor **(124)** that references the calibration **(122)** to transform the time-varying electrical parameter **(70)** into a time-varying tidal volume **(120)** of air in the lungs.

10. The imaging system **(10)** as set forth in claim **1**, further including:

an image data binning means **(40)** for sorting imaging data into respiratory cycle phase bins **(42)** based on the time-varying respiration characteristic **(110)**, the reconstruction processor **(46)** reconstructing data in a selected one or more of the respiratory cycle phase bins.

11. The imaging system **(10)** as set forth in claim **1**, further including:

an electrocardiograph **(66)** that measures electrocardiographic data of the subject using at least the pair of electrodes **(30, 32)**.

12. The imaging system **(10)** as set forth in claim **1**, wherein a substantial portion of the thoracic region of the subject is disposed between the contacting electrodes **(30, 32)**.

13. A medical diagnostic imaging method including:
acquiring imaging data of a medical imaging patient;
reconstructing at least a part of the acquired imaging data into an image representation;
measuring a time-varying electrical parameter **(70)** across an electrodes pair **(30, 32)** during the acquiring of imaging data; and
computing a time-varying respiration characteristic **(90, 98, 110, 120)** based on the measured time-varying electrical parameter **(70)**.

14. The method as set forth in claim 13, further including::
contacting a thoracic region of the patient with the pair of electrodes **(30, 32)**.

15. The method as set forth in claim 14, wherein the contacting of the thoracic region with the electrodes pair **(30, 32)** includes:
relatively arranging the electrodes pair **(30, 32)** with a substantial portion of the thoracic region disposed therebetween.

16. The method as set forth in claim 13, wherein the acquiring of imaging data includes:
passing x-rays through an imaging region **(20)**;
measuring x-ray intensities after passing through the imaging region **(20)**; and
computing x-ray absorption data from the measured x-ray intensities.

17. The method as set forth in claim 13, wherein the measuring of a time-varying electrical parameter **(70)** includes:
applying one of a voltage and a current to the electrodes pair **(30, 32)**;
measuring the other of voltage and current responsive to the applying; and
computing the time-varying electrical parameter **(70)** based on the applied and measured quantities.

18. The method as set forth in claim 17, wherein the applying step includes:
applying a pulse train of voltage or current pulses.

19. The method as set forth in claim 13, further including:
measuring cardiac cycling data using the pair of electrodes **(30, 32)**.

20. The method as set forth in claim 19, wherein the measuring of cardiac cycling data using the pair of electrodes (30, 32) is performed substantially simultaneously with the measuring of a time-varying electrical parameter (70) across the electrodes pair (30, 32).

21. The method as set forth in claim 13, wherein the measuring of a time-varying electrical parameter (70) across the electrodes pair (30, 32) includes:

measuring a time-varying resistance across the electrodes pair (30, 32).

22. The method as set forth in claim 13, wherein the computing of a time-varying respiration characteristic (90, 98, 110, 120) from the time-varying electrical parameter (70) includes:

determining a respiration state (90) based on a temporal slope of the time-varying electrical parameter (70).

23. The method as set forth in claim 13, wherein the computing of a time-varying respiration characteristic (90, 98, 110, 120) from the time-varying electrical parameter (70) includes:

selecting a respiration state (90) based on a temporal slope of the time-varying electrical parameter (70), the respiration state (90) being selected as one of:

inhaling corresponding to a positive temporal slope,

exhaling corresponding to a negative temporal slope, and

a breath-hold state corresponding to a generally horizontal slope.

24. The method as set forth in claim 13, wherein the computing of a time-varying respiration characteristic (90, 98, 110, 120) from the time-varying electrical parameter (70) includes:

computing a respiration rate (98) proportional to a temporal frequency of the time-varying electrical parameter (70).

25. The method as set forth in claim 13, wherein the computing of a time-varying respiration characteristic (90, 98, 110, 120) from the time-varying electrical parameter (70) includes:

computing a time-varying tidal volume function (120) of air in lungs of the patient based on the time-varying electrical parameter (70).

26. The method as set forth in claim **13,** wherein the computing of a time-varying respiration characteristic **(90, 98, 110, 120)** from the time-varying electrical parameter **(70)** includes:

computing a time-varying respiratory cycle phase function **(110)** based on the time-varying electrical parameter **(70).**

27. The method as set forth in claim **13,** further including:

gating the acquiring of imaging data based on the extracted time-varying respiration characteristic **(90, 98, 110, 120).**